

REMARKS

Claims 35-46 are pending in this application. As a result of claim additions, amendments and cancellations in this Response to Office Action, claims 35-51 will be pending in this application.

In the Office Action dated January 9, 2004, the Examiner withdrew his earlier rejections of claims 35-39 and 43-46 in view of Applicant's arguments and instead applied new rejections based upon newly discovered references. The Examiner rejected claims 35-39, 43 and 45 under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,659,330 (Sheridon) in view of U.S. Patent No. 6,473,072 B1 (Comiskey, et al.) and further in view of U.S. Patent No. 6,369,954 (Berge et al.) and further in view of U.S. Patent No. 5,165,013 (Faris). The Examiner also rejected claim 44 under 35 U.S.C. § 103(a) as being obvious over the Sheridan, Comiskey et al., Berge et al. and Faris patents in further view of U.S. Patent No. 6,377,249 (Mumford).

Applicant thanks the Examiner for his indication that claims 40-42 and 46 contain allowable subject matter, although they have been objected to as being dependent on a rejected base claim. Applicant has added new claims 47-50 which correspond to claims 40-42 and 46 with the limitations of their dependent and base claims incorporated. Applicant believes that these claims should be in condition for allowance.

Applicant believes, however, that claims 35-39 and 43-45 as amended are also allowable and urges the Examiner to reconsider his rejections, in accordance with the arguments below.

Arguments

Applicant's invention as shown in Figures 9A-9C and as claimed in claims 35-39 and 43-45, relates to liquid droplets that are induced to move or to change their shape and to thereby create electrowetting and electrostatic screen display systems, color displays and transmission means. The claimed invention uses the controlled movement or shape-manipulation of light-transmissive liquid droplets to refract or modulate the direction in which the light passes through the droplets onto selected areas of a plurality multi-colored light filters that are associated with each droplet. In this way, the droplets in Applicant's claimed device act as optical lenses -- to

change the direction of light passing through them and to direct that light onto external color filters, thereby changing the color of light emerging from the display.

As set forth in amended claim 35, Applicant's invention requires "one or more measures of a light transmissive liquid" as well as "a plurality of multi-colored light filters comprising a plurality of differently-colored elements being associated with each measure of liquid". Applicant's invention also requires "inducing a change in the location or shape of said affected liquid measures, and thereby refracting and modulating the direction of light passing through said liquid measures to be directed onto or through selected colored areas of said multi-colored light filters".

In contrast to the prior art cited by the Examiner, the droplets in Applicant's claimed device are not a media that incorporates any color or any visual indicia on or within them. None of the references cited, either individually or in combination, contain any reference to the use of droplets to redirect light onto external multi-color filters. Furthermore, even a combination of the cited references would not result in a display system that uses clear droplets to divert light onto selected color areas of multi-colored filters.

The Examiner cites Sheridan as teaching all the elements of the display device in claim 35 except for "selected color areas of multi-colored light filters" and "inducing a change in shape of affected liquid measures, and thereby causing light passing through liquid measures to be directed onto or through selected areas". Applicant respectfully points out to the Examiner that this is misleading, as Sheridan's system is almost the opposite of the claimed invention. Sheridan describes an electro-capillary system in which colored droplets of the particular colors desired for display in a particular pixel are expanded or contracted and thereby to fill the pixel in question with the desired color. A requirement of Sheridan is that there be at least two droplets in each pixel area, and each of those droplets will be of a different color. Importantly, in Sheridan, the droplets do not direct light onto any other areas, and certainly not colored filters. Instead, the droplets in Sheridan color the light passing through them so as to provide color pixels to the display, and as such Sheridan teaches away from the claimed invention. Moreover, Sheridan does not teach or suggest the redirecting or refracting of light passing through the

droplets. Applicant's claimed device does not rely upon using the droplet to itself color the light passing through the droplets, and the droplets in Applicant's claimed device do not incorporate any color to act as a light filter themselves. Therefore, Sheridan is clearly a completely different system than that claimed.

The Examiner also states that Comiskey permits the user to draw in multiple colors using pixelated rear line electrodes and that it would have been obvious to implement the Comiskey approach in the apparatus of Sheridan in order to change the display color on the first substrate upon activation of a switch. However, the approach used in Comiskey, which describes an electromorphic system that involves the migration of colored particles inside micro-capsules under the influence of an electric field, bears no relationship at all to Applicant's claimed device. In Comiskey, the display media includes colored particles or solvent droplets, and capsules adjacent to the electrode includes colored particles and dye to form different colored regions. In order to draw in color, a voltage is applied to the pixel or line electrodes corresponding to the desired color, such that other colored particles migrate away from the protective layer and displaying the desired color. By setting the rear electrodes at differing voltage potentials, various color effects, such as color combinations, may be achieved.

In Comiskey, similar to Sheridan, the droplets do not direct light onto any other areas, and certainly not colored filters, but instead color the light passing through them so as to provide color pixels to the display. Moreover, Comiskey does not teach or suggest the redirecting or refracting of light passing through the droplets. Applicant's claimed device does not rely upon moving colored solvents or particles to itself color the light passing through the droplets, and the droplets in Applicant's claimed device do not incorporate any color to act as a light filter themselves. Therefore, Comiskey is clearly a completely different system than that claimed.

The Examiner further states that Berge teaches inducing a change in shape of affected liquid measures, by liquid lenses having a variable electrically controlled focus by using the phenomenon of electrowetting. The Examiner asserts that it would have been obvious to implement the Berge approach in Sheridan and Comiskey apparatuses to direct light onto or through selected colored areas of multicolored light filters in order to achieve a luminous color

screen. Applicant disagrees with the Examiner. Amended claim 35 uses the controlled movement or shape-manipulation of light-transmissive liquid droplets to refract or modulate the direction in which the light passes through the droplets onto selected areas of a plurality multi-colored light filters that are associated with each droplet. Berge changes the height of the droplet, but does not distort it, in order to change the focal length of the light passing therethrough. There is no change in the singular direction of the light that passes through the droplet in Berge, only in the focal length of the light. In fact, Berge uses this change in focal length to describe a possible second embodiment with color -- in which an array formed of groups of three, separately controlled, variable focus lenses having different colors stopping or allowing through light. Thus, Berge does not teach or suggest the redirecting of light passing through the droplets. Furthermore, in the color embodiment, the droplets do not direct light onto any other areas, and certainly not colored filters, but instead color the light passing through them so as to provide color pixels to the display.

Applicant's invention claims a novel device. As shown in Figures 9A and 9B, a liquid droplet in air (thus, not using two different liquids, but rather fluids) has its shape changed by the application of an electric field which varies in strength across the area of the droplet, thereby inducing the droplet to "want to" move towards the strongest electric field, whereas the hydrophobic properties of the inner surface with which the droplet is in contact induces it to move in the opposite direction. Applicant has thereby achieved a very innovative means of moving the droplet to wherever desired along that plane and simultaneously allowing distortion of the shape of the droplet. By achieving these two functions, Applicant is able to controllably redirect or modulate the direction of the light passing through the droplets to whatever color zone of the multi-colored filter is desired.

Applicant's claimed invention is absolutely different from any of the approaches described in the prior art, and none of the cited prior art either discloses or renders obvious the claimed devices. None of the cited references provides or suggests any device having "a plurality of multi-colored light filters comprising a plurality of differently-colored elements being associated with each measure of liquid". None of the cited systems uses or suggests using a plurality of multi-colored filters with a plurality of different colored elements being associated

with each droplet. None of the cited references describes use of droplets to selectively divert or change the direction of light onto color filters. None of the cited references even uses or suggests any means at all of controllably diverting or changing the direction of light in order to change color. None of the cited systems uses or suggests using droplets to function by changing the direction of the light so as to focus the light onto different colored filters.

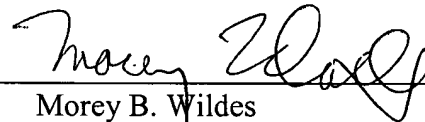
Conclusion

Reconsideration of the present application, as amended, is requested. If, upon review, the Examiner is unable to issue an immediate Notice of Allowance, the Examiner is respectfully requested to telephone Applicant's undersigned attorney in order to resolve any outstanding issues and advance the prosecution of the case.

A favorable action on the merits is earnestly solicited.

Respectfully submitted,

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